

The Effect of a Brief Environmental Problems Module on Endorsement of the New Ecological Paradigm in College Students

Bruce E. Rideout

ABSTRACT: The author measured endorsement of the New Ecological Paradigm (NEP) in college students following their involvement in a 2- to 3-week environmental problem module focused on global environmental problems and energy issues. The module included readings, discussion, and a writing exercise, and was presented during 3 sequential semesters within a course on research design. Students from the 3 groups were all tested subsequently in spring 2001. When compared with control data, data from students receiving the educational module showed significant increases in NEP endorsement that declined somewhat with time but remained significantly greater after 3 semesters. In contrast, retention of knowledge from the module showed a predictable decrease over time.

KEY WORDS: environmental attitudes, NEP scale, environmental awareness

The emerging concerns of both local and global environmental problems over the past several decades have given rise to a broad array of educational programs in primary and secondary schools (e.g., Leeming, Dwyer, Porter, & Cobern, 1993; Rickinson, 2001; Zimmermann, 1996). The implicit goal of such programs has been to create an electorate that is better informed on environmental issues and, thus, better able to make appropriate decisions that have an effect on ecological problems. It has also been suggested that children can have an important role in influencing consumption and other environmentally relevant behaviors of their parents (Uzzell, 1999). Many of these educational programs have served as sources for research data, and this research has typically looked for changes in knowledge, attitude, affect, and, occasionally, environmentally relevant behaviors. Although this behavior change is of ultimate concern, the other measures are all recognized as related to the behavioral decisions in question. Models for the determination of behavior

Bruce E. Rideout is a professor in the Department of Psychology at Ursinus College, Collegeville, Pennsylvania.

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reflect the complexity of the relationships among these cognitive and affective mediators (Gardner & Stern, 2002).

In 1978, Dunlap and Van Liere created the New Environmental Paradigm (NEP) scale as a means of assessing an individual's general recognition of contemporary environmental problems and the implicit difficulties in the traditional human–nature relationship. Dunlap and Van Liere designed their brief study to go beyond problem-specific attitude measures and to assess the basic beliefs that could define what they saw to be the emerging, more proenvironmental worldview. The NEP is thought to be replacing the dominant social paradigm, which is based on the ideas of unlimited resources and human exemptionalism (Catton & Dunlap, 1980).

Although factual knowledge of environmental issues is not a sole determinant of worldview or behavior, it can have some influence over such broad perspectives in the individual. A large base of factual ecological data was, of course, essential in the initial scientific understanding that has led to greater public awareness of ecological problems. In their presentation of the revised NEP scale, Dunlap, Van Liere, Mertig, and Jones (2000) point out that while the NEP scale assesses “primitive beliefs” about the human–nature relationship, it “should be responsive to personal experiences . . . and to information . . . concerning the growing seriousness of environmental problems” (p. 433). Early and persistent environmental education (EE), preferably including direct involvement in environmental action, may be the most effective treatment for producing proenvironmental behavior. Nevertheless, it is of interest to determine the efficacy of a brief environmental education experience at the college level in promoting a change in worldview. The present study explored the effect of a 2- to 3-week environmental problems module on NEP endorsement in the context of an undergraduate psychology research methods course.

Method

Participants

The 85 participants were all students enrolled in a research methods course that is required for a concentration in psychology and offered every semester with a maximum enrollment of 20. Students were typically sophomores or juniors, with only seniors included occasionally. Participants were predominantly women due to the high proportion of women enrolled in the major.

Procedure

All of the posttreatment data and some of the control data were collected in spring 2001. The treatment was a 2- to 3-week educational module devoted to global environmental problems, with some emphasis on global warming/climate change and energy issues. The module included readings, discussion, and writing. The writing component was a laboratory report in which relevant issues and readings were cited as part of the introduction and rationale for reporting results of a survey of environmental attitudes on campus. No information on the NEP scale was included in the readings or referred to during class presentations or discussion. Experimental data came from students receiving the module in fall 1999, spring 2000, and fall 2000. Control data came from students who took the course in spring 1999, from students who did not have the module, and also from students taking the course in spring and fall 2001, prior to having the module. Students from the latter two groups were added to the spring 1999 controls because of the small *N* in that group. This small *N* was because many of the spring 1999 students having graduated before data collection occurred. Student assistants distributed the NEP surveys, which were returned in envelopes via campus mail to ensure anonymity. Grouping the data according to the semester of

exposure to the module enabled consideration of the effect of delaying data collection, or the effect of time passing, on the dependent measures.

Knowledge Assessment

In addition to measurement of the NEP scale and the recording of gender and age, knowledge retention was assessed by the inclusion of 6 knowledge-based, multiple choice questions (see Appendix A) presented on the reverse side of the NEP scale. Answers to all questions were covered during the module.

Educational Module

A listing of a sample readings packet from the module is given in Appendix B. In general, readings included book excerpts and magazine and newspaper articles dealing with relevant environmental issues. The initial, core reading (from Ayres, 1999 in Appendix B) describes four major global environmental problems: CO₂ elevation, loss of biodiversity, high consumption, and growing population. Other readings include excerpts from Vital Signs (WorldWatch Institute, 1999, in Appendix B), articles on solar and wind energy, and relevant articles from The New York Times (see Stevens, 2000, Appendix B). Although the readings packet was not specifically designed to be alarmist in content, the shock value to students was typically in proportion to initial ignorance of these issues. The often counterproductive depressing effect of these readings was offset by the inclusion of optimistic material on alternative energy and by open discussion of students' emotional reactions to the serious environmental issues described. Effort was also made to "inoculate" against overly negative reactions by means of warnings prior to assignment of the reading.

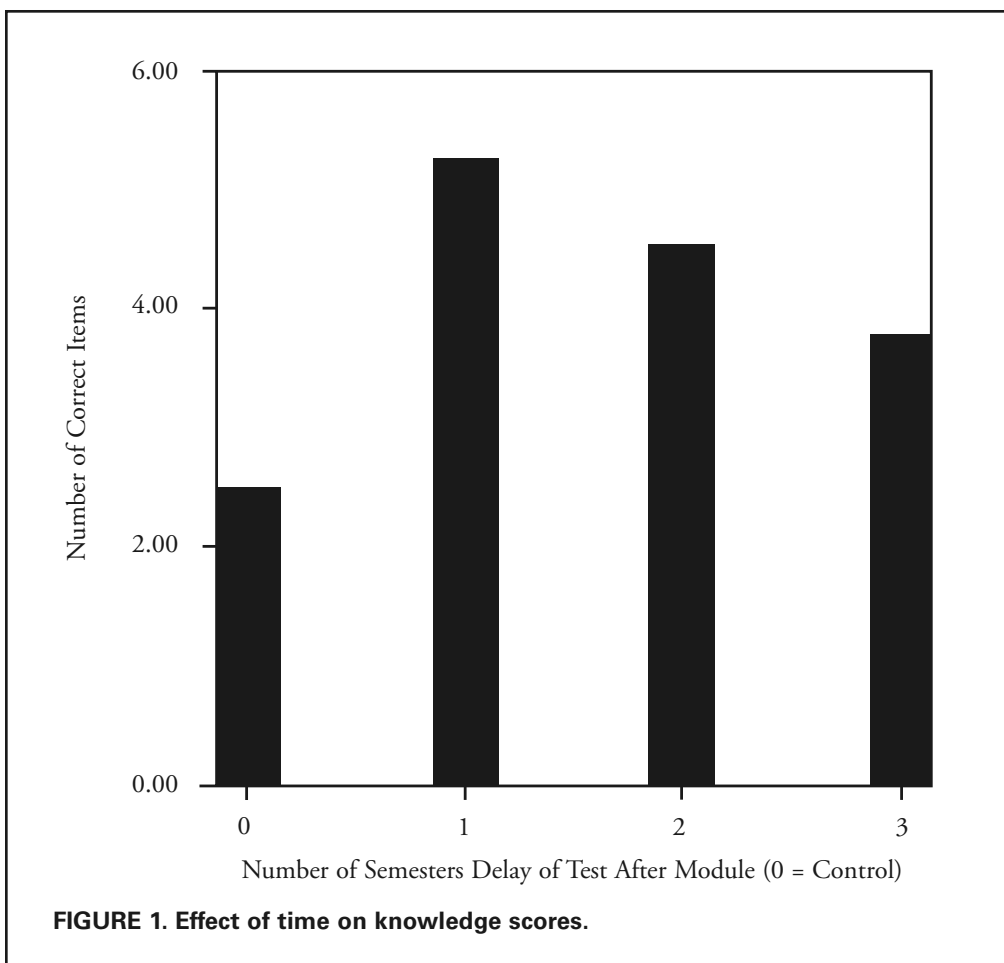
Results

Knowledge Assessment

The results of knowledge assessment were consistent with expectation in showing a predictable forgetting of factual information with time (see Figure 1). All three experimental groups differed from the control group. The means for number of correct items were: controls ($N = 40$), $M = 2.5$ ($SD = 1.13$); one semester delay ($N = 13$), $M = 5.23$ ($SD = 0.83$), $t(51) = 8.0$, $p < .001$; one year delay ($N = 17$), $M = 4.53$ ($SD = 1.37$), $t(55) = 5.803$, $p < .001$; three semester delay ($N = 15$), $M = 3.8$ ($SD = 1.26$), $t(53) = 3.674$, $p < .001$. A one-way analysis of variance (ANOVA) for the three groups of experimental data indicated a significant effect of delay, $F(2, 42) = 4.928$, $p < .012$, and knowledge was significantly correlated with delay, $r = -.436$, $p < .01$.

NEP Assessment

NEP responses are summarized in Table 1, which shows the total pro-NEP agreement as a percentage for the four groups of the study (after allowing for the reversed direction of even-numbered items). Small sample sizes limit the precision of the tabled values, particularly for the experimental groups. However, the overall indication is that the module had an impact on endorsement of the NEP perspective. Endorsement reaches 100% for 7 of the 15 items in the one-semester delay group, then decreases in the groups having greater delay. But the decrease is not as systematic as in the case of the knowledge retention, and the difference between endorsement values for the controls and for the three-semester delay group is quite variable across the scale items. Four items (1, 5, 8, 9) show virtually no change, but two of those are near ceiling. The NEP scale was constructed to measure five different aspects of worldview with three items for each aspect. The five item types deal with (a)



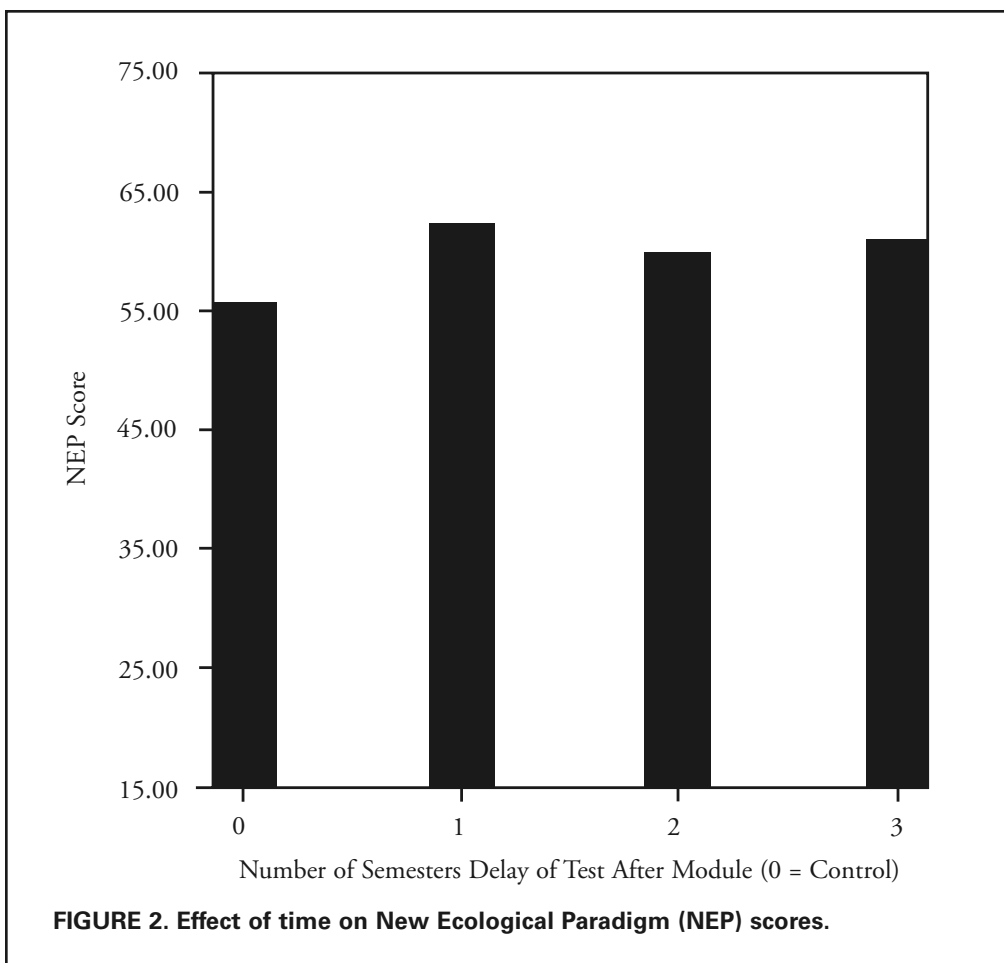
nature as a limited resource (items 1, 6, 11); (b) antianthropocentrism (2, 7, 12); (c) nature as delicately balanced and subject to human interference (3, 8, 13); (d) antiexemptionalism (4, 9, 14); and (e) the likelihood of an ecological crisis (5, 10, 15). As with the items showing the least effect, those showing the greatest change (4, 10, 11) were a mixture of types, focusing on antiexemptionalism, eco-crisis, and limits. The large change in item 10 is quite consistent with the considerable amount of classroom discussion (during the module) that covered the Ayres (1999) reading on global environmental crises and the question of the believability of environmentalist literature. Factor analyses carried out on larger systematic samples at this institution (Rideout, Hushen, McGinty, Perkins & Tate, 2005) were consistent with the results of Dunlap et al. (2000).

A second way of considering the results of the present study is to examine Likert responses directly, scored 1 (*strongly agree*) through 5 (*strongly disagree*). Table 2 shows mean Likert scores after correcting for the directionality of the items (that is, pro-NEP attitudes are represented as higher numbers). One can also compute a total NEP score directly from the Likert responses. Since differing degrees of agreement (or disagreement) are scored differently, the NEP score, computed as the sum of (corrected) item scores (range: 15–75), is more sensitive to respondents' strength of feeling on the

TABLE 1. Pro-New Ecological Paradigm (NEP) Agreement for NEP Scale Items

NEP item ^a	Total pro-NEP, in percentages			
	Control (n = 40)	1-semester delay (n = 13)	1-year delay (n = 17)	3-semester delay (n = 15)
1. We are approaching the limit of the number of people that the earth can support.	70	100	88.2	73.3
2. Humans have the right to modify the natural environment to suit their needs.	57.5	61.5	58.8	66.6
3. When humans interfere with nature it often produces disastrous consequences.	85	100	82.4	93.3
4. Human ingenuity will ensure that we do not make the earth unlivable.	50	61.5	64.7	73.4
5. Humans are severely abusing the environment.	82.5	100	94.1	86.7
6. The earth has plenty of natural resources if we just learn how to develop them.	27.5	46.2	17.6	40
7. Plants and animals have as much right as humans to exist.	82.5	76.9	94.1	100
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.	80	100	82.4	80
9. Despite our special abilities, humans are still subject to the laws of nature.	95	100	82.4	93.3
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated.	60	92.3	88.3	86.6
11. The earth is like a spaceship with very limited room and resources.	55	100	82.4	80
12. Humans were meant to rule over the rest of nature.	67.5	61.6	70.5	80
13. The balance of nature is very delicate and easily upset.	70	76.9	76.4	80
14. Humans will eventually learn enough about how nature works to be able to control it.	65	69.3	76.4	73.3
15. If things continue on their present course, we will soon experience a major ecological catastrophe.	55	100	88.2	73.3
Mean total pro-NEP, in percentages	66.8	83.1	76.5	78.6

^aActual wording: listed below are statements about the relationship between humans and the environment. For each one, please indicate whether you "strongly agree," "mildly agree," are "unsure," "mildly disagree," or "strongly disagree" with it.



different survey items. Results in terms of NEP scores are shown in Figure 2. Control scores differed from those of the one semester delay group, control ($M = 55.6$, $SD = 7.9$), one semester delay ($M = 62.3$, $SD = 5.8$), $t(51) = 2.808$, $p < .007$, and also differed from those of the three semester delay group ($M = 61$, $SD = 6.1$), $t(53) = 2.380$, $p < .021$, but comparison with the one-year delay group failed to reach significance ($M = 59.5$, $SD = 8.2$). ANOVA on data from the three experimental groups showed no significant effect of delay, again contrasting with the more systematic decline of knowledge scores with time. The correlation of NEP score with delay was also nonsignificant within the experimental data set.

Discussion

The results of this study indicated that, at the college level, a brief, 2–3 week educational module primarily devoted to global environmental problems and energy issues could influence endorsement of the NEP, as measured by the NEP scale. The elevation of NEP endorsement decreased initially but persisted at a significant level for at least three semesters, and this persistence clearly contrasted with the quite predictable loss of factual knowledge over the same period.

TABLE 2. Mean Pro-NEP Likert Scores

NEP item ^a	Mean Likert scores (after adjustment for direction)			
	Control (n = 40)	1-semester delay (n = 13)	1-year delay (n = 17)	3-semester delay (n = 15)
1. We are approaching the limit of the number of people that the earth can support.	3.67	4.69	4.12	3.93
2. Humans have the right to modify the natural environment to suit their needs.	3.27	3.38	3.53	3.47
3. When humans interfere with nature it often produces disastrous consequences.	3.92	4.69	4.06	4.07
4. Human ingenuity will ensure that we do not make the earth unlivable.	3.47	3.54	3.71	4.07
5. Humans are severely abusing the environment.	4.15	4.77	4.47	4.47
6. The earth has plenty of natural resources if we just learn how to develop them.	2.57	3.08	2.41	2.87
7. Plants and animals have as much right as humans to exist.	4.30	4.15	4.59	4.73
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.	4.00	4.38	4.12	4.27
9. Despite our special abilities, humans are still subject to the laws of nature.	4.35	4.54	4.24	4.67
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated.	3.62	4.38	4.29	4.20
11. The earth is like a spaceship with very limited room and resources.	3.37	4.54	4.06	3.87
12. Humans were meant to rule over the rest of nature.	3.82	3.38	4.12	4.20
13. The balance of nature is very delicate and easily upset.	3.85	4.23	3.88	4.27
14. Humans will eventually learn enough about how nature works to be able to control it.	3.72	3.85	3.76	4.00
15. If things continue on their present course, we will soon experience a major ecological catastrophe.	3.47	4.69	4.18	3.93
Mean pro-NEP Likert score	3.70	4.15	3.97	4.07

^aActual wording: listed below are statements about the relationship between humans and the environment. For each one, please indicate whether you "strongly agree," "mildly agree," are "unsure," "mildly disagree," or "strongly disagree" with it.

Therefore, the present results generally confirm the suggestion of Dunlap et al. (2000) that the NEP instrument should be responsive to information. It should be emphasized, though, that the information was not restricted to a factual, “top-down” lecture. The educational experience in this study involved substantial discussion of issues, including discussion of students’ emotional reactions to the reading content and other relevant current events. Students were also engaged in the implicit, more reflective processing of content that was required for writing the lab report associated with the module. It should also be noted that even the control scores represent considerable pro-NEP endorsement, well above that seen in the student population at large in this institution, reported elsewhere (Rideout et al., 2005). This higher level of endorsement was likely because of gender as women are overrepresented among psychology majors, show higher levels of NEP scores at this institution, and, in general, have also shown greater environmental concern in other studies using other measures. A group with more negative or skeptical views on environmental issues might be more resistant, or even reactant to the module.

Behavior was not assessed in the present study, so the ultimate impact of the educational experience employed is not known. Over a longer time, the influence of the module on worldview could diminish further. More optimistically, even with a further decrease in endorsement with time, subsequent recovery of NEP endorsement could be facilitated by “booster” experiences or knowledge that is compatible with the content of the module. Consistent with current models of behavioral decision making, the final determination of proenvironmental behavior will be a function of other factors as well, such as norms, more specific attitudes, and the behavioral options available, in addition to worldview. However, the present findings suggest that brief, open confrontation with the serious environmental issues facing society can help to generate a proenvironmental perspective in a college population.

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APPENDIX A

Knowledge Assessment Questions

1. What do you understand to be the primary cause of global warming?
 - (a) acid rain
 - (b) increased carbon dioxide
 - (c) loss of ozone
 - (d) increased ozone
 - (e) particulates, such as soot from smoke

2. The greatest single source of air pollution in the United States today is
(a) heavy industry (b) light industry (c) fires (d) transportation (e) utilities
 3. The Intergovernmental Panel on Climate Change (IPCC) concluded in 1996 that stabilizing our atmosphere and avoiding climate disruptions would require a reduction from 1990 levels of greenhouse gas emissions by
(a) 10-20% (b) 30-40% (c) 40-60% (d) 60-80% (e) 80-90%
 4. Global population is approximately
(a) 600 million (b) 1 billion (c) 2 billion (d) 4 billion (e) 6 billion
 5. Chronic over-fishing can be a threat to the productivity and viability of oceanic ecosystems. Of the 15 major fishing grounds worldwide, the number of currently seriously depleted fishing grounds is
(a) 3 (b) 5 (c) 8 (d) 11 (e) 13
 6. The purpose of the 1997 Kyoto Conference was to
(a) agree on whaling restrictions (b) protect rainforests
(c) protect atmospheric ozone (d) reduce acid rain
(e) control greenhouse gas emissions
- Correct answers: (b), (d), (d), (e), (d), (e)

Appendix B

Module Readings, Fall 2000^a

- Ayres, Ed. (1999). *God's last offer: Negotiating for a sustainable future* (pp. 1-45). New York: Four Walls Eight Windows.
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^a Articles for different groups varied because of continuous updating of module content.

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